



Clinical Anesthesiology

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# Low-Dose Ketamine Infusion Appears Safe Even Without Continuous Hemodynamic Monitoring

New York—Are low-dose ketamine infusions for analgesia safe for patients who are not in a setting with continuous monitoring? The answer is yes, according to a small retrospective study.

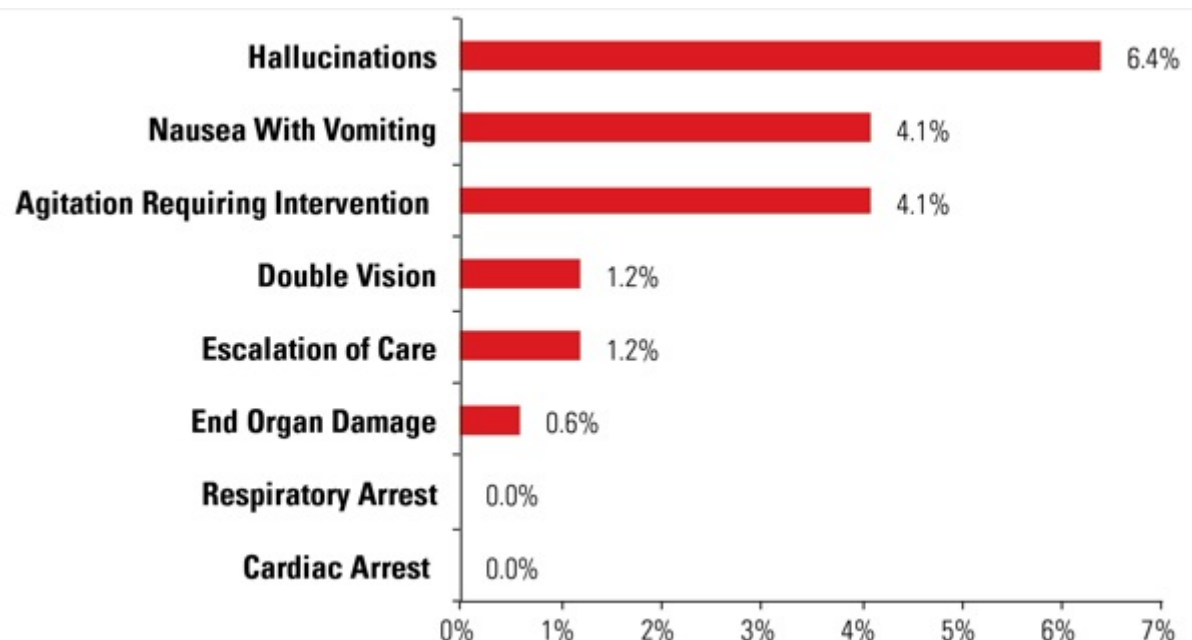
Lt. Cmdr. Jeffrey M. Carness, MD, and his colleagues at the Naval Medical Center Portsmouth, in Virginia, have long recognized the efficacy of ketamine in subanesthetic doses within their practice, despite the drug's "dynamic" effects as an analgesic.

"Ketamine has received a bad reputation because of its unpredictable effects," Dr. Carness explained during the New York State Society of Anesthesiologists' PostGraduate Assembly (abstract P-9088). "There is some fear surrounding its potential cardiovascular and psychotogenic complications."

## Evidence Supports Monitoring

Dr. Carness and his colleagues noted that the literature supports the efficacy of using low-dose ketamine when treating acute and chronic pain in a monitored setting.

A study by Bell et al (*Acta Anaesthesiol Scand* 2005;49:1405-1428) found that in 27 of 37 cases, within the first 24 hours after surgery, ketamine reduced both morphine requirements and postoperative nausea and vomiting. Another study by Ahern et al (*Pain Med* 2015;16:1402-1409) found that for patients with severe pain in the emergency department, a low-dose ketamine infusion protocol "provided significant pain relief, with mostly mild side effects and no severe adverse events."



([http://www.anesthesiologynews.com/aimages/2016/AN0516\\_004a\\_18434\\_600.jpg](http://www.anesthesiologynews.com/aimages/2016/AN0516_004a_18434_600.jpg))

**Figure. Adverse events.**

Despite the literature substantiating the use of low-dose ketamine infusions in monitored settings, the investigators realized that there is very little literature reviewing adverse events (AEs) involving subanesthetic doses of ketamine when used outside of a monitored setting. Seeing the efficacy of the drug in their own ward setting, which does not use continuous hemodynamic monitoring, Dr. Carness and his team decided to conduct their study.

### **Benign Hallucinations**

After approval by the institutional review board of the Naval Medical Center Portsmouth, Dr. Carness and his team conducted their study as a retrospective analysis. Patients receiving ketamine infusions, with an average dose of 5 mcg/kg per minute, were identified through the pharmacy database. Electronic medical records in the institution were then cross-referenced for cases in which patients treated with low-dose ketamine infusions experienced adverse effects.

Of the 302 patients identified, 171 met the inclusion criteria. Records revealed AEs on 27 occasions—22 in men and five in women—amounting to an event rate of 15.8%. Maximum infusion rates averaged 5.47 mcg/kg per minute in men and 5.04 mcg/kg per minute in women. One patient experienced urinary retention that required Foley catheter placement, although Dr. Carness said, “It’s extremely unlikely that the ketamine was the cause of this event, but it was noted nonetheless.” The only other notable AE was a patient who experienced transient postoperative tachycardia. The patient was transferred to a monitored setting and underwent what turned out to be an unremarkable evaluation before being returned to the ward setting.

The remaining 25 patients had mild events that were mostly neuropsychiatric. No major instances of morbidity, mortality or hemodynamic instability were identified among the patients, suggesting that the use of low-dose ketamine infusions in a setting without continuous hemodynamic monitoring “appears safe, without requirement for additional critical care resources,” Dr. Carness said.

Although there is a long-held belief that hallucination in and of itself is an AE, Dr. Carness and his colleagues questioned just how threatening the experience may be for a patient.

“One major revelation that we found in treating patients with low-dose ketamine infusions is that hallucinations can be relatively benign,” Dr. Carness said.

“I worked with one patient who complained of a phantom man in the corner,” Dr. Carness said. “And when I asked him if he was bothered by him, he said, ‘No, I just see him over there.’ We both agreed to ‘keep our eye on him,’ and the patient remained calm. It begs the question, is this really an adverse effect on the patient if the patient is not disturbed by the effect?”

In future studies, the team at the medical center will continue to look into the rate and type of complications associated with low-dose ketamine infusion, and create a new protocol to address the safety of ketamine with opioid combination versus opioids alone.

As Dr. Carness noted, “It has worked so well within our institution, we hope to publicize its utility and encourage other institutions to see the efficacy and relative safety of the drug when administered in the absence of continuous hemodynamic monitoring.”

—Brigid Duffy

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*The views expressed in this interview and article are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense or the U.S. government. Dr. Carness reported no relevant financial disclosures.*